

## REMARKS

### I. INTRODUCTION

With the addition of claims 23 to 26, claims 1 to 14 and 16 to 26 are pending in the present application.

Reconsideration of the present application in view of this response is respectfully requested.

### II. OBJECTION TO CLAIMS 11-14 and 16

Claims 11 to 14 and 16 stand objected to for certain alleged informalities.

In regards to claim 11, the Office Action requests clarification regarding the at least one thermal sensor recited in claim 1 and the detection unit recited in claim 11, as well as how the detection unit is illustrated in Fig. 1.

Claim 1 recites "at least one thermal sensor for detecting **a change in temperature of the material** associated with ... [an] electric [or] magnetic field." (Emphasis added). In this regard, the present application provides, for example, that:

Applying an electric and/or magnetic field causes a change in the corresponding field, which leads in particular to a certain heating of these materials. With the help of a thermal sensor according to the present invention, it is possible in an advantageous manner to detect the change in temperature of the material.

Specification, page 2, lines 3 to 6. The detection unit as recited in claim 11, by contrast, is "for detecting a **portion** of a heating of the material **attributed to an electric current**". (Emphasis added). In this regard, the present application, provides, for example, the following:

A detection unit is preferably provided for detecting the portion of the heating of the material attributed to the electric current. It is guaranteed here that only the portion of heating of the material that can be attributed to the electric current can be detected. This permits compensation for the heating of the material caused by the electric current.

Specification, page 4, lines 20 to 23.

The present application refers to the heating of the material caused by the electric current as "resistance heating" and provides an example of how this type of heating may be determined. In particular, the present application states that:

The heating due to electric power (resistance heating) is determined here **by determining the conductivity**. An analyzer unit (not shown in detail) is capable of compensating this heating of test materials 2 caused by resistance heating, **so that only the heating which occurs due to the piezoactive property of test materials 2 can be determined.**

Specification, page 7, lines 7 to 11. (Emphasis added). Hence, in order to determine the heating which occurs only due to the piezoactive properties of the test materials, a detection unit is provided "for detecting a portion of a heating of the material attributed to an electric current", so that this portion of heating not due to the piezoelectric properties of the test materials may be compensated for when detecting a change in temperature using the at least one thermal sensor. In particular, the portion of the heating not due to piezoelectric properties may be determined, for example, by determining the conductivity. In this regard, Fig. 1 has amended to show the detection unit as distinct from the at least one thermal sensor. It is therefore

respectfully requested that the objection to claim 11, and the objection to claim 12, which depends from claim 11, be withdrawn.

In regards to the asserted lack of antecedent basis for "test areas" recited in claims 13 and 14, it is respectfully submitted that claims 13 and 14 as presented provide proper antecedent basis and are self-explanatory. It is therefore respectfully requested that the objections to claims 13 and 14 be also withdrawn.

In regards to the asserted lack of clarity of the relationship between the "optical measurement unit" recited in claim 16 and the "measurement unit" recited in claim 1, claim 16 has been amended to recite that "the measurement unit includes an optical measurement unit for measuring a change in at least one of a shape and a length of the material", which is consistent with the illustration of these units in Fig. 1. It is therefore respectfully submitted that claim 16 as presented is clear with respect to the optical measurement unit. Withdrawal of the objection to claim 16 is therefore respectfully requested.

**III. REJECTION OF CLAIMS 1-4, 6-14, 16,  
17, 20 and 21 UNDER 35 U.S.C. § 103(a)**

Claims 1 to 4, 6 to 14, 16, 17, 20 and 21 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Japanese Patent No. 09325165 to Okuda et al. ("Okuda") in view of U.S. Patent No. 6,359,372 to Dujari et al. ("Dujari"). It is respectfully submitted that claims 1 to 4, 6 to 14, 16, 17, 20 and 21 are not rendered unpatentable over Okuda in view of Dujari for at least the following reasons.

Claim 1 relates to a device for testing a material that changes shape when an electric and/or magnetic field is applied. Claim 1 recites that the device includes a generator for generating and applying the electric and/or

magnetic field to the material, at least one thermal sensor for detecting a change in temperature of the material associated with the electric and/or magnetic field, and a measurement unit for measuring a change in shape of the material after the electric and/or magnetic field is applied.

Okuda purports to relate to measuring the thermal expansion coefficient of a thin material. See Okuda, Abstract. As admitted on page 4 of the Office Action, Okuda does not disclose a material that changes shape when an electric and/or magnetic field is applied, or a generator for generating and applying the electric and/or magnetic field to the material.

Dujari purports to relate to printed circuit card assemblies having controlled expansion properties. See Dujari, col. 1, lines 5 to 7. In particular, Dujari provides a mechanism for altering the mechanical properties of the printed circuit card assemblies by embedding piezoelectric blocks and imposing a voltage thereon to control the thermal expansion of the circuit card. See Dujari, col 1, line 66 to col. 2, line 5. In this manner, by altering the mechanical properties of circuit card, the effective coefficient of thermal expansion of the circuit card can be tailored to more closely match the coefficient of thermal expansion of devices soldered thereto. See Dujari, col. 2, lines 7 to 11.

The Examiner asserts on page 8 of the Office Action that "it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the device disclosed by Okuda by replacing the deformable material with a deformable material, as disclosed by Dujari, in order to determine the thermal coefficient of the deformable material and properly control the deformation of the material when it is used in a circuit card assembly". Applicant respectfully disagrees and submits that the

alleged suggestion of replacing the test sample material of Okuda with a circuit card having embedded piezoelectric blocks or the piezoelectric blocks themselves is merely a suggestion on the part of the Examiner and lacks any supporting basis in either Okuda or Dujari.

In rejecting a claim under 35 U.S.C. § 103(a), the Examiner bears the initial burden of presenting a prima facie case of obviousness. In re Rijckaert, 9 F.3d 1531, 1532, 28 U.S.P.Q.2d 1955, 1956 (Fed. Cir. 1993). To establish prima facie obviousness, three criteria must be satisfied. First, there must be some suggestion or motivation to modify or combine reference teachings. In re Fine, 837 F.2d 1071, 5 U.S.P.Q.2d 1596 (Fed. Cir. 1988). This teaching or suggestion to make the claimed combination must be found in the prior art and not based on the application disclosure. In re Vaeck, 947 F.2d 488, 20 U.S.P.Q.2d 1438 (Fed. Cir. 1991). Second, there must be a reasonable expectation of success. In re Merck & Co., Inc., 800 F.2d 1091, 231 U.S.P.Q. 375 (Fed. Cir. 1986). Third, the prior art reference(s) must teach or suggest all of the claim limitations. In re Royka, 490 F.2d 981, 180 U.S.P.Q. 580 (C.C.P.A. 1974).

Applicant respectfully submits that there is no suggestion or motivation in the references cited by the Office Action to replace the test sample material of Okuda with piezoelectric blocks or a circuit card assembly. Instead, Dujari merely suggests embedding the piezoelectric blocks into a circuit card assembly to account for a **known** mismatch of coefficients of thermal expansion without further elaboration of a need to measure the thermal expansion coefficient of any component of the circuit card assembly and certainly not any suggestion of a need to measure the thermal expansion coefficient of the piezoelectric blocks themselves in order to properly control the expansion. Indeed, Dujari explicitly states that the

expansion is controlled by an applied voltage and by the size of the piezoelectric blocks or the distance between them. See e.g., Dujari, col. 4, lines 26 to 31.

Accordingly, the required motivation or suggestion to combine the teachings of Okuda with the teachings of Dujari is lacking.

Applicant still further submits that the combination of Okuda and Dujari fails to disclose all of the limitations of amended claim 1. In particular, Applicant submits that neither Okuda nor Dujari disclose "at least one thermal sensor for detecting a change in temperature of the material associated with the at least one of the electric field and the magnetic field" as recited by claim 1.

(Emphasis added). Although Okuda discusses a variation of the temperature of the test material and Dujari discusses a variation of the temperature of circuit card assemblies, such variation is not discussed as associated with or resulting from an applied electric or magnetic field, but rather, as merely independently applied via an unspecified means or via a heating/cooling mechanism. Accordingly, since neither Okuda nor Dujari disclose at least one thermal sensor for detecting a change in temperature of the material associated with the electric or magnetic field as recited in claim 1, claim 1 is not rendered obvious by their combination. In re Royka, 490 F.2d 981, 180 U.S.P.Q. 580 (C.C.P.A. 1974) (prior art reference(s) must teach or suggest all of the claim limitations).

Claims 2 to 4, 6 to 14, 16, 17, 20 and 21 ultimately depend from claim 1 and therefore include all of the limitations of claim 1. Accordingly, claims 2 to 4, 6 to 14, 16, 17, 20 and 21 are likewise not rendered obvious for at least the same reasons that claim 1 is not rendered obvious. In re Fine, 837 F.2d 1071, 5 U.S.P.Q.2d 1596 (Fed. Cir. 1988) (any dependent claim that depends from a non-obvious independent claim is non-obvious).

Moreover, it is respectfully submitted that a *prima facie* case of obviousness has not been made in the present case, since the Office Action never made any findings, such as, for example, regarding what the ordinary skill level in the art would have been at the time the claimed subject matter of the present application was made. (See In re Rouffet, 47 U.S.P.Q.2d 1453, 1455 (Fed. Cir. 1998) (the "factual predicates underlying" a *prima facie* "obviousness determination include the scope and content of the prior art, the differences between the prior art and the claimed invention, and the level of ordinary skill in the art"))). It is respectfully submitted that the proper test for showing obviousness is what the "combined teachings, knowledge of one of ordinary skill in the art, and the nature of the problem to be solved as a whole would have suggested to those of ordinary skill in the art," and that the Patent Office must provide particular findings in this regard -- the evidence for which does not include "broad conclusory statements standing alone." (See In re Kotzab, 55 U.S.P.Q. 2d 1313, 1317 (Fed. Cir. 2000) (citing In re Dembiczak, 50 U.S.P.Q.2d 1614, 1618 (Fed. Cir. 1999) (obviousness rejections reversed where no findings were made "concerning the identification of the relevant art," the "level of ordinary skill in the art" or "the nature of the problem to be solved")))). It is again respectfully submitted that there has been no such showing by the Office Action.

In fact, it is respectfully submitted that the lack of any of the required factual findings in the Office Action forces Applicant to resort to unwarranted speculation to ascertain exactly what facts underlie the present rejections. The law requires that the Patent Office provide the factual basis for rejecting a patent application under 35 U.S.C. § 103. (See In re Piasecki, 745 F.2d 1468, 1472, 223 U.S.P.Q. 785, 788 (Fed. Cir. 1984) (citing In re Warner,

379 F.2d 1011, 1016, 154 U.S.P.Q. 173, 177 (C.C.P.A. 1967))). In short, the Office has failed to carry the initial burden of presenting a proper prima facie case of obviousness. (See In re Oetiker, 977 F.2d 1443, 1445, 24, U.S.P.Q.2d 1443, 1444 (Fed. Cir. 1992)).

In view of the foregoing, it is respectfully submitted that Okuda in view of the Dujari does not render obvious any of claims 1 to 4, 6 to 14, 16, 17, 20 and 21. Withdrawal of the rejection of claims 1 to 4, 6 to 14, 16, 17, 20 and 21 under 35 U.S.C. § 103 over Okuda in view of the Dujari is, therefore, requested.

As regards the Office Action's assertion that claim 21 is a "product by process" claim (which is not conceded), claim 21 has been amended to recite that "the electric contacting includes at least one of a layer of metal sputter or and a layer of metal arranged on a layer of glue." (Emphasis added). It is respectfully submitted that claim 21 as presented is allowable.

#### IV. REJECTION OF CLAIM 19 UNDER 35 U.S.C. § 103(a)

Claim 19 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Okuda and Dujari in view of Japanese Published Patent 09325165 to Oji ("Oji"). Claim 19 ultimately depends from claim 1, and is therefore allowable for at least the same reasons as claim 1, since the secondary reference Oji does not cure the critical deficiencies of the primary references Okuda and Dujari, as explained above. Indeed, the Office Action does not allege that it does. Withdrawal of this rejection is therefore respectfully requested.



**V. REJECTION OF CLAIMS 5 and 18 UNDER 35 U.S.C. § 103(a)**

Claims 5 and 18 stand rejected under 35 U.S.C. § 103(a) as unpatentable over Okuda and Dujari in view of Japanese Patent No. 03122544 to Shimizu et al. ("Shimizu"). Claims 5 and 18 ultimately depend from claim 1, and are therefore allowable for at least the same reasons as claim 1, since the secondary reference Shimizu does not cure the critical deficiencies of the primary references Okuda and Dujari, as explained above. Indeed, the Office Action does not allege that it does. Withdrawal of this rejection is therefore respectfully requested.

**VI. REJECTION OF CLAIM 22 UNDER 35 U.S.C. § 103(a)**

Claim 22 stands rejected under 35 U.S.C. § 103(a) as unpatentable over Shimizu in view of Dujari. It is respectfully submitted that Shimizu in view of Dujari does not rendered claim 22 unpatentable for at least the following reasons.

Claim 22 relates to a device for testing a material that changes shape when an electric or magnetic field is applied, in which the device includes a generator for generating and applying the electric or magnetic field to the material to produce a change in shape or size of the material, a camera configured to capture an image of the material after the electric or magnetic field is applied to the material, and an analyzer unit configured to determine the change in shape or size of the material based on the captured image.

Shimizu purports to measure the stress of a film of a thin material by using a camera 10 to detect the amount of warp of a sample 4 at various temperatures and in various kinds of ambiances when placed in a furnace 1, so as to

determine its thermal expansion coefficient. As admitted in the Office Action, Shimizu does not disclose a deformable material that changes shape when an electric or magnetic field is applied thereto, or a generator for generating the electric or magnetic field.

The Office Action asserts that "[i]t would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the device disclosed by Shimizu by replacing the deformable material, as disclosed by Dujari, in order to determine the thermal coefficient of the deformable material and properly control the deformation of the material when it is used in a circuit card assembly."

Applicant respectfully disagree since as earlier noted that Dujari does not disclose or suggest a need to determine the thermal expansion coefficient of the piezoelectric materials in order to properly control their deformation when used in the circuit card assembly. Instead, Dujari merely suggests embedding the piezoelectric materials into a circuit card assembly to account for a **known** mismatch of coefficients of thermal expansion without further elaboration of a need to measure the thermal expansion coefficient of any component of the circuit card assembly and certainly not any suggestion of a need to measure the thermal expansion coefficient of the piezoelectric materials themselves in order to properly control the expansion. Indeed, Dujari explicitly states that the expansion is controlled by an applied voltage and by the size of the piezoelectric blocks or the distance between them. See e.g., Dujari, col. 4, lines 26 to 31. Accordingly, the required motivation or suggestion to combine the teachings of Shimizu with the teachings of Dujari is lacking.

Moreover still, as earlier noted, it is respectfully submitted that a *prima facie* case of obviousness has not been made in the present case, since the Office Action never made any findings, such as, for example, regarding what the ordinary skill level in the art would have been at the time the claimed subject matter of the present application was made, and that the lack of any of the required factual findings in the Office Action forces Applicant to resort to unwarranted speculation to ascertain exactly what facts underlie the present rejections.

In view of the foregoing, it is respectfully submitted that Shimizu in view of the Dujari does not render obvious claim 22. Withdrawal of the rejection of claim 22 under 35 U.S.C. § 103 over Shimizu in view of the Dujari is, therefore, requested.

#### **VII. New Claims 23-26**

New Claims 23 to 26 do not add any new matter and are fully supported by the present application, including the Specification. Claims 23 to 26 depend either directly or indirectly from claim 1, are therefore allowable for at least the same reasons as claim 1.

CONCLUSION

It is respectfully submitted that all pending claims are in condition for allowance. Passage to issuance is, therefore, requested.

Respectfully submitted,

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